

Effectiveness of Nitrous Oxide as a Liquid Injection Thrust Vector Control Fluid, Phase I

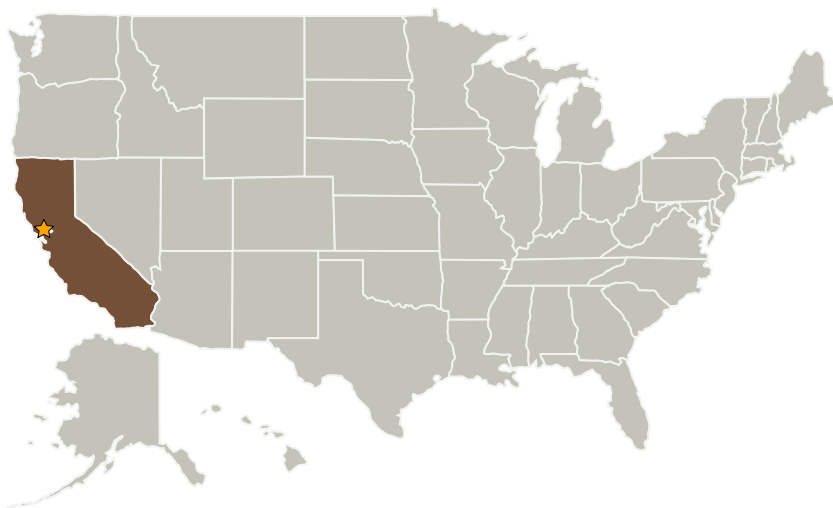
Completed Technology Project (2008 - 2008)



Project Introduction

Nitrous Oxide is proposed as an energetic liquid injection thrust vector control fluid for vehicle attitude control during dynamic vehicle maneuvers. Pulled from the main propulsion system oxidizer tank, it features system simplicity, no toxicity, room temperature storability, high system mass fraction and superior performance due to its exothermic decomposition characteristics, answering the need for innovative attitude control technologies. A series of 1,000 lb thrust hybrid rocket motor tests are proposed to characterize Nitrous Oxide's Side Specific Impulse as a function of thrust vectoring angle. At the conclusion of Phase 1, the technology will be ready for development for a small upper stage, and will be at a TRL of 5. At the end of Phase 2, its performance characteristics will be completely known, and its development for an integrated Main Propulsion/Thrust Vector Control /Attitude Control System for a small launch vehicle would be appropriate.

Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
★Ames Research Center(ARC)	Lead Organization	NASA Center	Moffett Field, California
Whittinghill Aerospace, LLC	Supporting Organization	Industry	Camarillo, California



Effectiveness of Nitrous Oxide as a Liquid Injection Thrust Vector Control Fluid, Phase I

Table of Contents

Project Introduction	1
Primary U.S. Work Locations and Key Partners	1
Organizational Responsibility	1
Project Management	2
Technology Areas	2

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Ames Research Center (ARC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Effectiveness of Nitrous Oxide as a Liquid Injection Thrust Vector Control Fluid, Phase I

Completed Technology Project (2008 - 2008)



Primary U.S. Work Locations

California

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

George R Whittinghill

Technology Areas

Primary:

- TX01 Propulsion Systems
 - └ TX01.1 Chemical Space Propulsion
 - └ TX01.1.1 Integrated Systems and Ancillary Technologies